

 Project Report: Stock Price Forecasting using LSTM (IREDA & SBI)

 Author: Hemant Singh

 Affiliation: BTech Student, IIT Bombay

 Project Type: Self-Initiated Machine Learning Project

 Timeline: June 2025

Project Overview

This self-driven project aims to predict the future stock prices of two Indian companies — **SBI (SBIN.NS)** and **IREDA (IREDA.NS)** — using an LSTM (Long Short-Term Memory) based neural network. The project uses real-time financial data and forecasts the next 30 days of closing prices.

As someone who is personally invested in both these stocks, I wanted to analyze how machine learning techniques can help anticipate price movement based on historical trends. The project not only reflects technical learning but also demonstrates how finance and AI can be integrated into real-world investment strategies.

Objective

- To collect real-time stock data from Yahoo Finance for **SBI** and **IREDA**
 - To build and train an LSTM model that can understand stock price patterns
 - To predict the closing price for the next 30 days for each stock
 - To visualize actual vs predicted price trends
 - To reflect on investment potential using ML-based forecasting
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Why I Did This

As a mechanical engineering student passionate about data, trading, and finance, I'm always curious about applying machine learning in capital markets. I had personally invested in:

- SBI around ₹772
- IREDA around ₹170

Instead of blindly holding stocks, I wanted to explore whether **price prediction models** could provide insight into short-term volatility and help optimize entry or exit strategies. It's also a showcase of how engineering, programming, and finance intersect.

Dataset

Stock	Ticker	Data Source	Date Range	Records Used
SBI	SBIN.NS	Yahoo Finance	Jan 2023 – Jul 2024	~350 rows
IREDA	IREDA.NS	Yahoo Finance	Nov 2023 – Jul 2024	~150 rows

The dataset includes only the "Close" price to simplify the problem while still capturing meaningful trends.

Methodology

1. Data Collection:

Using yfinance, daily close prices were fetched for both stocks. Data was limited to recent periods (2023–2024) to ensure prices reflect true traded values without split adjustment distortions.

2. Preprocessing:

Data was scaled using MinMaxScaler, and 60-day windows were created as sequences for LSTM input.

3. Model Architecture:

- LSTM with 2 layers
- Dense layer output
- Loss: Mean Squared Error
- Optimizer: Adam
- Trained for 10 epochs

4. Forecasting:

The last 60 days of stock prices were used to recursively predict the next 30 days.

5. Visualization:

- Predicted vs Actual prices (last 100 days)
 - Next 30-day forecast curve
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Results

- **Model Fit:** LSTM captured patterns well and closely followed actual prices in recent days.
- **Forecasts:** The model gave reasonably smooth future price trends.

◆ Graphs:

1. sbi_prediction.png – Actual vs Predicted closing prices for SBI
 2. ireda_prediction.png – Actual vs Predicted closing prices for IREDA
 3. forecast_next30days.png – Future 30-day forecast for both stocks
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✅ Technologies Used

- Python
 - Google Colab
 - Libraries: yfinance, pandas, numpy, matplotlib, scikit-learn, keras, tensorflow
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📌 Key Learnings

- LSTM is well-suited for time-series financial data
 - Real financial data often comes adjusted — domain understanding is crucial
 - Preprocessing quality heavily affects prediction accuracy
 - ML can provide directional cues but is not a substitute for market judgment
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🧠 Future Work

- Add volume and news-based sentiment analysis
 - Use technical indicators (MACD, RSI) as features
 - Compare LSTM with ARIMA, XGBoost, and Prophet models
 - Build a live prediction dashboard using Streamlit
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📌 Conclusion

This self-project allowed me to combine real investment experience with machine learning application. It deepened my understanding of both financial markets and predictive modeling. I plan to evolve this project further and use it as a base for future portfolio intelligence tools.